



[4910-13]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2014-1079; Special Conditions No. 25-585-SC]

Special Conditions: Gulfstream Model GVII Series Airplanes; Limit Pilot Forces for Side-Stick Controller

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for the Gulfstream Model GVII-G500 (GVII series) airplanes. These airplanes will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport-category airplanes.

This design feature is associated with side-stick controllers that require limited pilot force because they are operated by one hand only. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: Effective **[Insert date 30 days after publication in the Federal Register]**.

FOR FURTHER INFORMATION CONTACT: Todd Martin, FAA, Airframe and Cabin Safety Branch, ANM-115, Transport Airplane Directorate, Aircraft Certification Service, 1601 Lind Avenue SW., Renton, Washington, 98057-3356; telephone 425-227-1178; facsimile 425-227-1320.

SUPPLEMENTARY INFORMATION:

Background

On March 29, 2012, Gulfstream Aerospace applied for a type certificate for their new Model GVII-G500 airplane.

The Model GVII series airplanes are large-cabin business jets capable of accommodating up to 19 passengers. The GVII series will certify a base configuration GVII-G500, which incorporates a low, swept-wing design with winglets and a T-tail. The airplanes have two aft-fuselage-mounted Pratt & Whitney turbofan engines. Avionics include four primary display units and multiple touchscreen controllers. The flight-control system is a three-axis, fly-by-wire system using active control/coupled side sticks.

The GVII-G500 has a wingspan of 87 ft. and a length of 91 ft. Maximum takeoff weight is 76,850 lbs. Maximum takeoff thrust is 15,135 lbs., maximum range is 5,000 nautical miles (nm), and maximum operating altitude is 51,000 ft.

The Model GVII series airplanes are equipped with two side-stick controllers instead of the conventional control columns and wheels. This side-stick controller is designed for one-hand operation. The requirement of Title 14, Code of Federal Regulations (14 CFR) 25.397(c), which defines limit pilot forces and torques for conventional wheel or stick controls, is not adequate for a side-stick controller. Special conditions are necessary to specify the appropriate loading conditions for this controller design.

Type-Certification Basis

Under the provisions of Title 14, Code of Federal Regulations (14 CFR) 21.17, Gulfstream must show that the Model GVII-G500 airplane meets the applicable provisions of 14 CFR part 25, as amended by Amendments 25-1 through 25-137.

The certification basis of the GVII-G500 airplane is 14 CFR part 25, effective February 1, 1965, including Amendments 25-1 through 25-137; 14 CFR part 34, as amended by Amendments 34-1 through the most current amendment at the time of design approval; and 14 CFR part 36, Amendment 36-29. In addition, the certification basis includes special conditions and equivalent-safety findings related to the flight-control system.

If the Administrator finds that the applicable airworthiness regulations (i.e., 14 CFR part 25) do not contain adequate or appropriate safety standards for the Model GVII series airplanes because of a novel or unusual design feature, special conditions are prescribed under § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the type certificate for that model be amended later to include any other model that incorporates the same or similar novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Model GVII series airplanes must comply with the fuel-vent and exhaust-emission requirements of 14 CFR part 34, and the noise-certification requirements of 14 CFR part 36. The FAA must issue a finding of regulatory adequacy under § 611 of Public Law 92-574, the “Noise Control Act of 1972.”

The FAA issues special conditions, as defined in 14 CFR 11.19, under § 11.38, and they become part of the type-certification basis under § 21.17(a)(2) for new type certificates, and § 21.101 for amended type certificates.

Novel or Unusual Design Features

The Gulfstream Model GVII series airplanes will incorporate the following novel or unusual design feature:

A side-stick controller for one-hand operation requiring wrist motion only, not arms.

Discussion

Current regulations reference pilot-effort loads for the flight deck pitch-and-roll controls that are based on two-handed effort. Special conditions are required for the Gulfstream Model GVII series airplanes based on similar airplane programs that include side-stick controllers. These special conditions are also appropriate for the Model GVII series airplane's side-stick controller.

These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Discussion of Comments

Notice of proposed special conditions no. 25-15-01-SC for the Gulfstream Model GVII series airplanes was published in the Federal Register on February 26, 2015 (80 FR 10422). No substantive comments were received, and the special conditions are adopted as proposed.

Applicability

As discussed above, these special conditions apply to Gulfstream Model GVII series airplanes. Should Gulfstream apply later for a change to the type certificate to include another model incorporating the same or similar novel or unusual design feature, these special conditions would apply to that model as well.

Conclusion

This action affects only certain novel or unusual design features on the Gulfstream Model GVII series airplanes. It is not a rule of general applicability.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued, in lieu of § 25.397(c), as part of the type-certification basis.

For Gulfstream Model GVII series airplanes equipped with side-stick controls designed for forces to be applied by one wrist and not arms, the limit pilot forces are as follows.

1. For all components between and including the side-stick control-assembly handle and its control stops:

PITCH	ROLL
Nose up, 200 lbf.	Nose left, 100 lbf.
Nose down, 200 lbf.	Nose right, 100 lbf.

2. For all other components of the side-stick control assembly, but excluding the internal components of the electrical sensor assemblies, to avoid damage to the control system as the result of an in-flight jam:

PITCH	ROLL
Nose up, 125 lbf.	Nose left, 50 lbf.
Nose down, 125 lbf.	Nose right, 50 lbf.

Issued in Renton, Washington, on June 2, 2015.

Jeffrey E. Duen
Manager, Transport Airplane Directorate
Aircraft Certification Service
[FR Doc. 2015-14904 Filed: 6/16/2015 08:45 am; Publication Date: 6/17/2015]